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NOVA SCOTIA

TIDAL POWER CORPORATION

REPORT BY THE PRESIDENT

ON THE AFFAIRS OF THE CORPORATION

FOR THE YEAR ENDED MARCH 31, 1989

During the year the Corporation's main objective was to resolve the problem of fish mortality in tidal power plants and thus to remove the main environmental impediment to large-scale development of the Cumberland Basin site. Encouraging progress was made.

Fish Diversion

As indicated in the Report by the President for the preceding fiscal year, the Corporation's studies indicate that fish mortality at the Annapolis Tidal Generating Station is relatively low and does not constitute a threat to fish stocks. Nevertheless, even a low single passage mortality rate would be unacceptable for turbines set in Cumberland Basin where fish are predicted to pass in and out through the barrage many times each season. The Corporation came to the conclusion that diversion of fish from turbines to suitable fishpasses would be necessary.

For this purpose Ontario Hydro was engaged in 1987 to test the efficacy of various behavioral devices. Low frequency, high intensity sound proved best. Tests indicated it was highly effective in moving adult shad away from the turbine forebay. Results were less positive for juveniles. As a result of this work, a diversion system was designed for the Annapolis site.

Testing of this design was undertaken in the year under review. As in the previous year, the work was contracted to Ontario Hydro and paid for by the Corporation. Nova Scotia Power Corporation made the station available, supplied the sound generators and paid at-site costs.

The diversion system proved highly effective for adult shad and other alosids. With the system inoperative it was found that about 30% of the adult fish moving seaward chose the turbine route, while the remaining 70% chose the original fishpass. With the sounder in operation, only one or two percent of the fish selected the turbine route and the balance used the original fishway.

Trials later in the year on outward-migrating juveniles produced less conclusive results. Data collected was incomplete because some of the sonar equipment had been destroyed by vandalism before the juvenile

migration began. Nevertheless, it was clear that juveniles did not respond to the same extent as adults. Further work on juveniles was scheduled for the following year. No further work is planned for adults, because the Corporation believes that the work done to date has provided adequate knowledge.

Sedimentation Studies

One of the potential problems of tidal power development in either Minas Basin or Cumberland Basin is the extent to which construction of a barrage might lead to sediment deposition in the headpond above the barrage. The question has both engineering and environmental implications. Preliminary studies of sedimentation had been done for Minas Basin but not for Cumberland. Design of a three-dimensional numerical model for Cumberland Basin in 1987 made such a study feasible. The Corporation subsequently agreed to share,jointly with Energy, Mines & Resources Canada and the National Research Council and Supply & Services Canada, in the cost of a study proposed by a Dartmouth consultant. The study was in progress at the year end.

The ability to predict sedimentation patterns resulting from engineering works is important in many fields of endeavour. Accurate results depend on a good understanding of the underlying physical (and perhaps chemical and biological) relationships. Work to improve this understanding will be undertaken in the LISP (Littoral Investigation of Sediment Properties) project scheduled for the summer of 1989 in Annapolis and Minas Basins. Scientists from Canada, the United States, Spain, Britain, and Argentina will participate. The Corporation provided seed money for this project, with the result that major sponsorship was obtained from Transport Canada, the Coast Guard, Energy, Mines & Resources, and others.

Decline of the clam fishery in Annapolis Basin has been blamed, by fishermen, on the Annapolis Tidal Generating Station. This allegation is under investigation by the Department of Fisheries & Oceans. While no real evidence to implicate the tidal plant has been found, it is a fact that a small build-up of sediment has occurred in some areas, particularly near Goat Island. The Corporation was asked by Fisheries & Oceans to participate in a modelling study in order to discover the cause of the sediment build-up and agreed to do so.

Economic Status of Tidal Power

Through the 1970's and early 1980's, and largely through the efforts of the Corporation, designs for tidal power plants at sites A8 and B9 in Cumberland Basin and Minas Basin were refined and constant dollar capital costs were reduced. While it cannot be claimed that present designs offer the ultimate in cost reduction, the Corporation believes that the remaining potential for improvement is relatively small.

Apart from capital cost per unit of output, the main factors affecting the competitive status of tidal power are the real interest rate, which largely determines the cost of tidal energy, and the cost of electricity from conventional sources.

Both these factors have been adverse in recent years. Although the real interest rate was lower during 1988 than in the early 1980's, it remains far above levels considered normal before the oil price shocks and inflation of the last decade. Oil prices dropped sharply in 1986 and stayed at relatively low levels through 1988. Also, the deregulation of gas markets, promoted by public policy in both the United States and Canada, has resulted in relatively cheap and plentiful gas in the United States.

Under present conditions, tidal power is not competitive with either oil-fired thermal plants or combined-cycle gas plants in New England. The Corporation does not foresee any significant change for the better over the next few years. On the other hand, scientific concern about atmospheric pollution and global warming is beginning to engender public concern. At some time in the not-too-distant future, renewable and non-polluting sources of energy will command a premium and tidal power will be readily marketable. It has been the Corporation's aim to ensure, to the extent possible, that when this situation arises, all technical and environmental problems will have been resolved so that development can proceed.

Administrative and Financial Matters

Two meetings of the Board of Directors were held during the year.

The Corporation operated within budget, reducing administrative costs by about $15,000 compared to the preceding year. Research expenditures increased slightly at $176,753, compared to $175,419 in fiscal 1987/88. Audited statements for the year ended March 31, 1989 are appended and form part of this report.

Dated May 30, 1989.

All of which is respectfully submitted.

Ronald Barkhouse
President & CEO

TIDAL POWER CORPORATION

F I N A N C I A L S T A T E M E N T S

MARCH 31, 1989

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AUDITORS' REPORT

To the Chairman and Directors
of Tidal Power Corporation

We have examined the balance sheet of Tidal Power Corporation as at March 31, 1989 and the statements of income and surplus for the year then ended, and have obtained all the information and explanations we have required. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion and according to the best of our information and the explanations given to us and as shown by the books of the Corporation, these financial statements are properly drawn up so as to exhibit a true and correct view of the financial position of the Corporation as at March 31, 1989 and the results of its operations for the year then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Doane Raymond.

Halifax, Nova Scotia

May 4, 1989

Chartered Accountants

TIDAL POWER CORPORATION

BALANCE SHEET

MARCH 31, 1989

ASSETS	1989	1988
Current		
Cash and short term deposits	$ 71,491	$ 10,539
Accounts receivable	62,153	174,300
	133,644	184,839
Office furniture, at cost less accumulated depreciation of $5,849 (1988 - $4,757)	16,021	16,986
	$149,665	$201,825
LIABILITIES		
Current		
Payables and accruals	$131,159	$182,925
SURPLUS		
Surplus	18,506	18,900
	$149,665	$201,825

ON BEHALF OF THE BOARD

Director

Director

TIDAL POWER CORPORATION

STATEMENT OF INCOME AND SURPLUS

YEAR ENDED MARCH 31, 1989

	1989	1988
Income		
Province of Nova Scotia (Note 2)	$286,800	$299,300
Interest	2,384	1,325
	289,184	300,625
Expenses		
Administration, promotion and travel	104,119	118,942
Audit	1,200	1,100
Depreciation - office furniture	1,092	1,087
Directors' fees	1,600	1,500
Legal	4,814	4,896
Research studies (Note 3)	176,753	175,419
	289,578	302,944
Excess of expenses over income	394	2,319
Surplus, beginning of year	18,900	21,219
Surplus, end of year	$ 18,506	$ 18,900

TIDAL POWER CORPORATION

NOTES TO FINANCIAL STATEMENTS

MARCH 31, 1989

1. The Tidal Power Corporation was established by Chapter 21 of the Statutes of Nova Scotia, 1970-71. Order-in-council 71-379 proclaimed that Chapter 21 of the Statutes of Nova Scotia 1970-71, the Tidal Power Corporation Act, came into force on the 22nd day of April, 1971.

2. Pursuant to Section 16 of the Tidal Power Corporation Act, funds for the purpose of carrying out the objects and powers of the Corporation were obtained from the Province of Nova Scotia. Income for the current year is $286,800 (1988 - $299,300).

3. Research studies

   Research expenditures, for the purpose of defining or mitigating impacts of large-scale tidal power development, were comprised of the following:

Fish diversion by behavioural devices	$139,953
Cumberland Basin - sedimentation study	36,000
Tidal Regime Modeling	800
	$176,753